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10/084,637	02/25/2002	Mohan Prabhu Kuvettu		3688

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EXAMINER.

ILDEBRANDO, CHRISTINA A

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 11/13/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

C706

Office Action Summary

Application No.

10/084,637

Applicant(s)

KUVETTU ET AL.

Examiner

Christina Ildebrando

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-35 is/are rejected.
- 7) ☒ Claim(s) 1-3,6,17,20,21 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 3 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only, i.e. claim 1 or claim 2. See MPEP § 608.01(n). Accordingly, claim 3 has not been further treated on the merits.
2. Claims 1 and 21 are objected to because of the following informalities: claims 1 and 21 do not end with a period ("."). Appropriate correction is required.
3. Claim 2 is objected to because of the following informalities: "consisting of" should be "consists of." Appropriate correction is required.
4. Claim 6 is objected to because of the following informalities: Claim 6 recites that the low silica molecular sieve is exchanged with NH_3 . However, it is believed that applicant intends to recite that the molecular sieve is exchanged with NH_4 . Ammonia would not undergo ion-exchange with the molecular sieve whereas NH_4 will. Appropriate correction is required.
5. Claim 17 is objected to because of the following informalities: "is the range of" should be "is in the range of." Appropriate correction is required.
6. Claim 20 is objected to because of the following informalities: "atmosphere steam containing phosphate" should be "atmosphere of steam containing phosphate." Appropriate correction is required.

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7. Claim 21 is objected to because of the following informalities: "A process according to claim 20 stabilization" should be "A process according to claim 20 wherein stabilization." Appropriate correction is required.

8. Claim 30 is objected to because of the following informalities: "a acid" should be "an acid." Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 4, 8-9, 14-15, and 19-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Claims 4 and 23 recite the limitation "wherein the high silica zeolite is selected from the group consisting of ZSM-5,... and preferably ZSM-5." This limitation renders the claim indefinite because it is not clear whether applicant is including ZSM-5 twice in the Markush group. It is suggested that applicant amend the claims to recite "wherein the high silica zeolite is selected from the group consisting of ZSM-5,..., and mordenite."

12. Claim 8 recites the limitation "wherein the low silica molecular sieve having rare earth metal oxides in the range of 0.1 to 10 wt%." This limitation renders the claim indefinite because it is not clear whether applicant is reciting the amount of molecular sieve present or the amount of rare earth metal oxide present. It is suggested that

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applicant amend the claim to recite "wherein the low silica molecular sieve contains rare earth metal oxides in the range of 0.1 to 10 wt%."

13. Claim 9 recites the limitation "the phosphate source" in line 1. There is insufficient antecedent basis for this limitation in the claims. Claim 1 does not recite or require a phosphate source. For purposes of search and examination, the claim has been examined as though dependent upon claim 2.

14. Claims 9 and 25 recite the limitation "wherein the phosphate source is selected from the group consisting of...or a mixture thereof." This limitation renders the claims indefinite because the alternative expression does not form a proper Markush group. Refer to MPEP 2173.05(h). It is suggested that applicant amend the claims to recite "wherein the phosphate source is selected from the group consisting of... and mixtures thereof."

15. Claim 14 recites the limitation "the organic acid" in line 1 and "colloidal silica" in line 2. There is insufficient antecedent basis for these limitations in the claims. Claim 1 does not recite or require an organic acid or colloidal silica. For purposes of search and examination, the claim has been examined as though dependent upon claim 13. It is suggested that applicant amend claim 14 to positively recite that an organic acid is used to acidify the colloidal silica, wherein the organic acid is selected from the group consisting of nitric acid, hydrochloric acid, formic acid, and acetic acid.

16. Claim 15 recites the limitation "the organic acid" in line 1 and "pseudoboehmite alumina" in line 2. There is insufficient antecedent basis for these limitations in the claims. Claim 1 does not recite or require an organic acid or a pseudoboehmite alumina.

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For purposes of search and examination, the claim has been examined as though dependent upon claim 13. It is suggested that applicant amend claim 14 to positively recite that an organic acid is used to acidify the pseudoboehmite alumina, wherein the organic acid is selected from the group consisting of acetic acid, formic acid, nitric acid, hydrochloric acid, and mixtures thereof.

17. Claim 15 recites the limitation "wherein the organic acid...is selected from the group consisting of...or a mixture thereof." This limitation renders the claim indefinite because the alternative expression does not form a proper Markush group. Refer to MPEP 2173.05(h). It is suggested that applicant amend the claims to recite "wherein the organic acid...is selected from the group consisting of... and mixtures thereof."

18. Claim 19 recites the limitation "wherein said catalyst having reduced coke formation property in the range of 12.99-12wt%." This limitation renders the claim indefinite because it is not clear what the range is referring to, i.e. the weight of the catalyst or the amount of coke that is formed or something else entirely. Also, it is not clear there is sufficient antecedent basis for the claim language "said catalyst having reduced coke formation property." The catalyst has been defined in claim 1 as a "low coke forming single particle catalyst." It is suggested that applicant use consistent antecedent basis throughout the claims.

19. Claim 20 recites the limitation "comprising essentially of stabilized high silica zeolite and a low silica molecular sieve." This limitation, i.e. "comprising essentially," renders the claim indefinite because it is not clear whether applicant intends the claim to be open-ended (i.e. "comprising") or partially open-ended (i.e. "consisting essentially

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of"). Therefore, the scope of the claim is unclear. Refer to MPEP 2111.03. For the purposes of search and examination, the claim has been given its broadest reasonable interpretation and examined as "comprising."

20. Claim 20 recites the limitation "adding milled clay slurry to the product of step (h)" in step (h). This limitation renders the claim indefinite because the step refers to itself. For the purposes of search and examination the claim has been examined as though the slurry is added to the product of step (g).

21. Claim 21 recites a process wherein the high silica zeolite is optionally stabilized with a phosphate source according to steps (a) – (d). However, claim 20, upon which claim 21 is dependent, recites a process for the stabilization of the high silica zeolite in steps (a) – (d). It is not clear if the optional steps of claim 21 are performed in addition to the steps recited in claim 20 or instead of the steps performed in claim 20. If applicant does indeed intend an alternative process, it is suggested that applicant rewrite the claim in independent form. Presently, it is noted that these optional steps are not required by the claimed process.

22. Claim 34 recites the limitation "using acids selected from the group consisting of...or a mixture thereof." This limitation renders the claim indefinite because the alternative expression does not form a proper Markush group. Refer to MPEP 2173.05(h). It is suggested that applicant amend the claims to recite "using acids selected from the group consisting of...and mixtures thereof."

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. Claims 1-2, 4-6, 8-9, 12-16, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosinski et al. in view of Vogt et al. and Cormier, Jr. et al.

Rosinski et al. (US 3,758,403) discloses a catalyst composition suitable for use in catalytic cracking processes, including fluid catalytic cracking (column 1, lines 10-25, column 10, lines 25-30, and column 19, lines 1-5). The catalyst composition comprises a mixture of a large pore size zeolite such as zeolite Y and a medium pore zeolite such as ZSM-5 (column 1, lines 15-25). The reference teaches that suitable ZSM-5 zeolites may have a silica to alumina molar ratio of at least 10 up to about 60 (column 3, lines 50-53). It is further taught that both the large pore zeolite and the medium pore zeolite may be ion exchanged with ions such as ammonium ions and rare earth metal cations (column 6, lines 73-75 and column 7, lines 1-15). The use of REY (rare earth exchanged Y zeolite) containing 1.8 % of rare earth oxides is exemplified by the reference (Example 12). With respect to the language of the claims, because the reference teaches the use of the same zeolites having the same silica to alumina molar ratios instantly disclosed and claimed, it is considered that the ZSM-5 zeolite would meet the high silica zeolite and the zeolite Y, particularly the ion exchanged forms taught by Rosinski et al., would meet the low silica molecular sieve, claimed herein.

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It is taught that the two types of zeolites may be combined with a matrix to form a single particle of a desired size and shape (column 7, lines 35-53). It is taught that the zeolites are mixed with a matrix such that the final composite contains 1-95% by weight, preferably 10-50% by weight of the zeolites (column 7, lines 55-60). It is further taught that the ratio of the ZSM-5 zeolite to the large pore zeolite is in the range from 1:10 up to 3:1 and is preferably 1:2 to 1:1 (column 9, lines 30-40). Suitable matrix materials include inorganic oxides such as clay, silica, and silica-alumina are particularly preferred because of their superior porosity, attrition resistance, and stability (column 8, lines 1-5). It is further taught that the silica matrix may contain 0-45% by weight of a metal oxide such as aluminum oxide (column 8, lines 35-65). The process limitations in claims 13-15 are noted. However, when the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to applicant to establish that their product is patentably distinct and not the examiner to show the same process of making. *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

The differences between the reference and the claims are: (1) the reference does not disclose that the high silica zeolite is stabilized, as described in the instant specification and required by claim 1, and (2) the reference does not disclose the proportions of silica, alumina and clay, as required by claim 1.

Vogt et al. (US 6,566,293) discloses a catalyst composition useful in fluidized catalytic cracking processes. The catalyst composition comprises a mixture ZSM-5 zeolite, zeolite Y, silica alumina binders and optionally kaolin clay (columns 3-4 and column 5, lines 35-65). The reference teaches that the addition of phosphorus to the

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ZSM-5 zeolite leads to improved activity and selectivity of the zeolite (column 1, lines 30-40). Because of this, Vogt et al. teaches that ZSM-5 is activated with a phosphorus containing compound prior to combining with the other components (column 4). The reference further teaches that the amount of alumina present in the composition is an important variable in that enough alumina must be present in the final catalyst composition to ensure sufficient bottoms cracking activity (column 5, lines 50-68).

Cormier, Jr. et al. (US 4,828,679) discloses a catalyst composition useful in fluidized catalytic cracking processes. The catalyst composition comprises a zeolite Y in combination with a zeolite such as ZSM-5 (column 4, lines 45-60). It is taught that the composition is combined with a matrix such as clay or a cogel including silica alumina (column 8, lines 55-65). The reference teaches that clay in combination with a cogel such as silica alumina is preferred (column 8, line 69 – column 9, line 3).

With respect to (1), it would have been obvious to one having ordinary skill at the time the invention was made to have modified the composition taught by Rosinski et al. to include the use of a phosphate containing ZSM-5 in light of the disclosure of Vogt et al. One would have been motivated to do so in light of the teaching by Vogt et al. that the addition of phosphorus to ZSM-5 zeolite leads to an improvement in activity and selectivity in catalytic cracking processes (column 1, lines 30-40 of '293). Because both catalyst composition may be used catalytic cracking processes including FCC processes, one would have a reasonable expectation of success from the combination.

With respect to (2), the Rosinski et al. reference does not disclose the relative proportions of silica, alumina, and clay in combination with zeolite Y and ZSM-5 as

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required by the instant claims. However, the reference does disclose amounts for the zeolites and the matrix which overlap the ranges instantly claimed. Overlapping ranges have been held to be a prima facie case of obviousness. *In re Malagari*, 182 USPQ. In addition, the Rosinski et al. reference teaches that the use of clay and silica alumina are preferred as matrices because of their superior porosity, attrition resistance, and stability (see column 8, lines 1-5 of '403), which suggests that the reference recognizes these as result effective variables. Moreover, the secondary reference to Vogt et al. teaches that the amount of alumina must be sufficient to ensure sufficient cracking activity (refer to column 5, lines 52-55 of '293) and the secondary reference to Cormier, Jr. et al. teaches that the combination of clay and a cogel such as silica-alumina is preferred (refer to column 9, lines 1-3 of '679).

Therefore, given the teachings of the prior art taken as a whole, it would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the ranges taught by the primary reference to arrive at the composition claimed. The use of silica, clay, and alumina in combination is recognized by the prior art as result effective variables, having an effect upon the properties of the final composition. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215. One would have been motivated to do so in order to obtain the most effective catalyst composition. Because

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all three catalyst compositions taught by the references are suitable for use in catalytic cracking processes, one would have a reasonable expectation of success from the combination.

With respect to the properties recited in claims 16 and 19, it is the position of the examiner that the product of Rosinski et al., modified as described above, would result the same composition as instantly claimed. Therefore, it is considered that those properties would be characteristic of the modified product of Rosinski et al.

25. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosinski et al. in view of Vogt et al. and Cormier, Jr. et al. as applied to claims 1-2, 4-6, 8-9, 12-16, and 19 above, and further in view of Scherzer et al.

The disclosure of Rosinski et al., as modified by Vogt et al. and Cormier, Jr. et al. is applied as above for claims 1-2, 4-6, 8-9, 12-16, and 19.

The modified disclosure of Rosinski et al. further does not teach that the low silica molecular sieve is exchanged with rare earth cations selected from the group consisting of lanthanum, cerium, praseodymium, neodymium, samarium, and gadolinium, as required by claim 7.

Scherzer et al. (US 3,676,368) discloses a rare earth exchanged zeolite Y catalysts useful in catalytic cracking processes. The reference teaches that the zeolite is exchanged with a mixture of lanthanum, cerium, and other rare earth ions (column 4, lines 5-35).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the invention of Rosinski et al. to include

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the use of lanthanum and cerium as the rare earth metal ions in light of the teaching by Scherzer et al. Rosinski et al. does not disclose the use of the specific rare earth metals instantly claimed. Rosinski et al. instead teaches the generic group of compounds, rare earth metals. The claims differ from the reference by reciting a specific species and a more limited genus than the reference. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to select any of the species taught by the reference, including those of the claims, because an ordinary artisan would have the reasonable expectation that any of the species of the genus would have similar properties and, thus, the same use as the genus as a whole. Additionally, the reference to Scherzer et al. provides additional motivation to choose the specific species claimed because Scherzer et al. teaches specifically the use of lanthanum and cerium in combination with zeolite Y. Because all of the catalyst compositions taught by the prior art references can be used in the same process, one would have a reasonable expectation of success from the combination.

26. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosinski et al. in view of Vogt et al. and Cormier, Jr. et al. as applied to claims 1-2, 4-6, 8-9, 12-16, and 19 above, and further in view of Chester et al.

The disclosure of Rosinski et al., as modified by Vogt et al. and Cormier, Jr. et al. is applied as above for claims 1-2, 4-6, 8-9, 12-16, and 19.

The modified disclosure of Rosinski et al. further does not teach the crystal sizes of the alumina and silica materials contained in the matrix.

Chester et al. (US 4,326,993) discloses a catalyst composition useful in catalytic cracking processes. Chester et al. teaches that the catalyst compositions contain matrices prepared from colloidal dispersions (i.e. particles in the range of 2-100 nm in size) of alumina and silica because these dispersions contain low levels of contaminants and allows for control of the physical and chemical properties of the catalyst composition (column 2, lines 5-60 and columns 5-6). (Pseudoboehmite alumina is alumina monohydrate).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the composition taught by Rosinski et al. to include alumina and silica compositions having the particle sizes instantly claimed in light of the teachings of Chester et al. One of ordinary skill would have been motivated to do so in light of the teaching by Chester et al. that compositions prepared using the colloidal dispersions of silica and alumina are easier to prepare, with fewer contaminants and allow for easier control of the chemical and physical properties of the catalyst. Because all of the catalyst compositions taught by the prior art can be used in catalytic cracking processes, one of ordinary skill would have reasonable expectation of success from the combination.

27. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosinski et al. in view of Vogt et al. and Cormier, Jr. et al. as applied to claims 1-2, 4-6, 8-9, 12-16, and 19 above, and further in view of Vasalos et al.

The disclosure of Rosinski et al., as modified by Vogt et al. and Cormier, Jr. et al. is applied as above for claims 1-2, 4-6, 8-9, 12-16, and 19.

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The modified disclosure of Rosinski et al. further does not teach the particle size of the catalyst composition as required by claims 17-18.

Vasalos et al. (US 4,153,535) discloses a catalyst composition useful in FCC processes and teaches that particles having a size in the range of 20-150 microns are suitable for fluidization (column 9, lines 35-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the invention taught by Rosinski et al. to include the use of particles in the size range instantly claimed in light of the teaching by Vasalos et al. One of ordinary skill would recognize that the size of the catalyst particle would be dictated by the type of process the catalyst will be used in. The secondary reference to Vasalos et al. teaches that catalyst particles having a size in the range of 20-150 microns are suitable for fluidization, thereby providing motivation to of ordinary skill to choose such particle sizes for the fluidized cracking process taught by Rosinski et al. Because all of the catalysts taught by the prior art can be used in fluidized catalytic cracking processes, one would have a reasonable expectation of success from the combination.

Allowable Subject Matter

28. Claims 20-35 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, and the objections for informalities set forth in this Office action.

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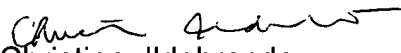
29. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach or suggest a process comprising the instantly claimed steps (a) – (l) in combination and does not provide any motivation to one of ordinary skill to arrive at the instantly claimed steps and conditions claimed.

Conclusion

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Ildebrando whose telephone number is (703) 305-0469. The examiner can normally be reached on Monday-Friday, 7:30-5, with Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.


Christina Ildebrando
Patent Examiner
Art Unit 1725
11/8/03

CAI
November 8, 2003